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rius belong to the glossopharyngeus, and are stated to rise from a group of small cells which lies mesial and cephalad of the F. gracilis, at the level of the superior pyramidal decussation.

*Beiträge zur Kenntnis des Centralnervensystems von Lumbricus.* BENEDICT FRIEDLÄNDER. (Berlin.) Zeit. f. wiss. Zool. Bd. 47, pp. 47-83, pl. IX, X, September, 1888.

The author's chief attention was directed to the relationships and not to the ultimate structure of the histological elements. Of the three problematical "neural canals" or "giant fibres" of Leydig, the two lateral ones are shown to be directly continuous with the processes of ganglion cells at the posterior end of the ventral nerve cord, while all three at the anterior part are connected with common nerve fibres. The sheaths of these three structures are composed of connective tissue fibres, and are not comparable to the medullary sheath of vertebrate nerve fibres: the contents is a homogeneous plasma that may be squeezed out in elongated masses. Each lateral "giant fibre" receives the ascending processes of several large bipolar ganglion cells lying ventrally in successive ganglia near the posterior end of the cord, while its most posterior connection is with the similar process of an unipolar ganglion cell. These ascending processes of ganglion cells are connected with one another by transverse processes, and these in turn with the median "giant fibre." Though thus composed of fused cell processes, the "giant fibres" appear quite homogeneous in all the best preparations, and no indication of such complexity of structure as that claimed by Nausen could be obtained, though the author will not deny that such structure may exist. Artificial and deceptive results, due to imperfect means of hardening, are common and difficult to avoid. The "giant fibres" are undoubtedly nervous structures of unknown function; their sheaths may have acquired a secondary importance as aiding in stiffening the ventral nerve cord.

E. A. A.

*Histologische Untersuchungen über das Nervensystem von Amphioxus.* E. ROHDE. Zool. Anzeiger XI, 190; Vorläufige Mittheilung. Abstract in Centralbl. f. Physiol. No. 10, 1888, by Paneth.

This paper gains much interest from the recent description of colossal nerve fibres in the ventral cord of Lumbricus and other worms. The central nervous system consists, in Amphioxus, of cells which lie near the central canal, and of fibres surrounding them. The supporting substance is formed by the basal prolongations of the ependyma cells. In some cases the prolongations are branched, forming a fine network. The ganglion cells are uni-, bi-, or multipolar, the last being most numerous. Their prolongations form the external nervous substance, which is mainly constituted of fine longitudinally coursing nerve fibres, in which dichotomous divisions are frequent. There are, moreover, a number of very large fibres, definite in both number and position, which arise from large multipolar ganglion cells. These prolongations are of two kinds; all except one lose their size by repeated divisions and form fine longitudinal fibres, while this one passes without any diminution in size, caudad to the other end of the cord. The paired fibres from the anterior end arise from twelve ganglion cells. There is an

analogous arrangement of cells and fibres in the posterior portion of the cord, save that the number of cells is fourteen, and that the large fibres coming from them pass cephalad to the anterior end of the cord. In this course they give off fine branches, but undergo little diminution in size, and finally terminate rather abruptly at the head end. (The failure of some of these colossal fibres to diminish in size during their course is a fact that needs further study.)

*Functional Nervous Diseases, their Causes and Treatment.* Memoir for the Concourse of 1881-1883, Académie royale de médecine de Belgique, with a supplement on the anomalies of refraction and accommodation of the eye and ocular muscles. GEORGE T. STEVENS. New York, D. Appleton & Co., 1887.

The title of this book is quite misleading, for the discussion of functional nervous diseases and treatment is almost exclusively limited to the relations which abnormalities of the eyes and the ocular muscles may hold to them. The author has particularly noticed that the eyes are abnormal in a large number of cases of functional nervous diseases, and further has found it possible to cure and relieve many of them by treating the eyes. He recognizes that unstable nervous systems are found, that the condition of instability may be hereditarily transmitted, and that the irritation proceeding from disordered eyes may be a stimulus strong enough to produce a functional disturbance in an unstable nervous system, without, perhaps, making it very plain by what he says that any strong stimulus may produce the same result, and that the instances which he presents are to be considered as special examples of this well recognized fact.

*Studien über den feineren Bau des Geschmacksorgans.* FRIEDRICH HERMANN. Erlangen, 1887. Druck der Universitätsbuchdruckerei von E. Th. Jacob. 8vo, SS. 41.

The first part of this monograph is occupied with an historical review and critical discussion of the results and conclusions reached by various investigators respecting the more intimate structure of the taste-bulbs. The remaining portion contains the results attained by Hermann, who confined himself, almost exclusively, to an examination of the foliate papilla of the rabbit. The supporting cells of the taste-bulbs, he says, are not flat cells, as supposed by some previous observers, but are spindle-shaped cells filled with fluid. They are of two kinds, inner and outer supporting cells. The outer cells, which he designates "pillar cells," and which constitute the true supporting element of the bulb, are pyramid or spindle-shaped cells, having their basal ends divided into a number of fine processes. The cell-body is marked by a distinct network of fine meshes. The nucleus is situated in the lower half of the cell-body, and contains two or three nucleoli. The inner supporting cells, which are fewer in number than the preceding, are cylindrical in form, having enlarged bases which break up into fine processes. The peripheral end of these cells does not bear needle-shaped processes. The nucleus is elliptical and lacks true nucleoli. These cells, Hermann thinks, may be those described by Schwalbe as "staff cells," and supposed by him to be sensory in function. Hermann describes a third kind of supporting cell, flat or conical in